

back of the boards compared to that at the back of the small plates. Experiments were also made on a model of a braced girder 29 feet long by 3 feet 7 inches deep, and on a roof model the sides of which were 8 feet by 7 feet. The ratio of the resistance per unit of area of the model girder to that of a square board in the wind was found to be precisely the same as the ratio of the resistance per unit of area of a small model of the girder made to a linear scale of 1 in 42 to a square plate in the experimental channel and uniform current used in the previous experiments. The resultant pressures on the roof were obtained, for both windward and leeward sides, at angles of 30, 45, and 60 degrees inclination to the horizontal, and indicated the considerable suction effects on the leeward side of a roof when the pressure inside the building is augmented from the windward side by open doors or windows. The results lead to the conclusion that the resistance of a complicated structure in the wind can be accurately predicted from a determination of the resistance of a small model of the structure in an experimental channel.

UNIVERSITY AND EDUCATIONAL INTELLIGENCE.

CAMBRIDGE.—Sir James Dewar has nominated Mr. H. O. Jones, of Clare College, as deputy for the Jacksonian professor of mental philosophy during the Lent term 1908. This nomination has received the consent of the Vice-Chancellor and the Sex Viri.

The sites syndicate recommends that a site on the Downing ground 40 feet wide, situate to the south of the botanical laboratory and parallel to it, be assigned for a building in connection with the Department of Agriculture.

Mr. W. Bateson, F.R.S., has been appointed reader in zoology.

Dr. Baker has been appointed chairman of the examiners for the mathematical tripos, part ii., 1908.

Prof. Nuttall has appointed F. P. Jepson, Pembroke College, to the studentship in medical entomology in place of A. H. Lees, who has resigned the studentship.

The board of agricultural studies is of opinion that the subjects which come under its cognisance are now too wide and too complex to be entrusted to a single professor. The appointment of Mr. T. B. Wood, of Gonville and Caius College, to the Drapers' professorship of agriculture has adequately provided for the teaching of agricultural chemistry, but the board is of opinion that it is urgently necessary that a professor in agricultural botany should be appointed without delay. This proposal has been brought within the range of possibility by the munificence of the Drapers' Company, which has offered a further grant of 200*l.* a year towards the stipend of a professor of agricultural botany. The general board has now put forward a report in which it recommends the establishment of such a professorship. This report will be discussed at an early date next term. The teaching of practical agriculture is entrusted to Mr. K. J. Mackenzie, late of the South-Eastern Agricultural College, Wye.

LONDON.—The committee of University College will shortly proceed to appoint a Derby scholar in zoology. The value of the scholarship is 60*l.* per annum, the scholarship being tenable for two years. An examination for the award of the scholarship will be held at University College on December 18. Full particulars can be obtained on application to the secretary, University College, Gower Street, W.C.

MANCHESTER.—The University will eventually benefit under the will of the late Prof. Thomas Barker, who from 1865–1885 was professor of mathematics at Owens College. The legacy, which it is estimated will amount to about 36,000*l.*, is to found a professorship of cryptogamic botany, and to establish scholarships for the assistance of students, especially those of slender means, in the departments of botany and mathematics.

OXFORD.—A portrait of Dr. A. J. Evans, F.R.S., the keeper of the Ashmolean Museum, painted by Sir William B. Richmond, was presented to the University on Saturday, December 7, in the presence of a large and dis-

tinguished company. The presentation was made on behalf of the subscribers by the principal of Brasenose, and the Vice-Chancellor accepted the portrait for the University.

MR. HALDANE, M.P., will, on Saturday, December 14, unveil the statue of the King, to be placed over the central entrance of the new buildings of University College School, Hampstead.

THE Melbourne correspondent of the *Daily Chronicle* reports that Mr. T. W. Stanford, brother of the founder of Stanford University, San Francisco, intends to leave by his will 50,000*l.* to found eight annual scholarships at Stanford University for young Australians. All candidates must pledge themselves to return to Australia and use the knowledge gained at the University in developing their native country.

SPEAKING at the Derby Municipal Technical College on December 5, Mr. Victor Cavendish, M.P., said he wished they could send forth from that gathering a message to those engaged in educational controversies that would result in placing education out of the range of controversy. He believed that money spent in extending the operations of institutions of that character was money well spent, and money from which, at no distant date, a most adequate and healthy return would be seen. Another subject was as to what extent we could improve our industrial and commercial position in the world. Upon such a question as foreign competition he felt that, however much they might differ on certain points, at any rate on the question of education they could unite in doing something for the future of the country by seeing that the youth of the nation had the very best technical education that could be given. Any money spent on such objects ought to receive the greatest support and consideration from all parties.

DURING the course of last week the Society of Merchant Venturers concluded the final arrangements for the reconstruction of the main building of their technical college in Bristol, and the work will now proceed with all possible speed. The society has devoted a large sum for additions to and improvements in the equipment of the departments of engineering, chemistry, and applied physics. In order to benefit by the most recent experience gained elsewhere, the principal and other members of the staff have visited some of the best-equipped technical and university colleges in Germany and in the United Kingdom.

To encourage the teaching of facts regarding weather and climate in schools, the council of the Royal Meteorological Society invites elementary teachers and others to send in essays in the form of an original nature-study lesson on weather or climate (not exceeding 1500 words in length), together with a brief synopsis of five other lessons to cover the whole subject of climate and weather. If essays of sufficient merit are received, three prizes will be awarded of 5*l.*, 3*l.*, and 2*l.* respectively. The essays are to be sent in before January 31, 1908, and addressed to Mr. William Marriott, assistant secretary, Royal Meteorological Society, 70 Victoria Street, London, S.W., from whom further information can be obtained.

THE fifth annual prize distribution of the Sir John Cass Technical Institute was held on Tuesday, December 3, when the prizes were distributed and an address given by Dr. R. T. Glazebrook, F.R.S. The chair was taken by Sir Owen Roberts, chairman of Sir John Cass's foundation. Dr. Glazebrook, in reviewing the work of the institute, dwelt upon the importance of the average amount of work done by each student rather than the number of students in attendance as a criterion of the value of the instruction given, and also pointed out the desirability of encouraging students in every possible way to follow grouped courses of study of a continuous character if real advantage is to follow from their labours. Further, it is necessary always to remember that learning and the assimilation of knowledge, admirable though they are in themselves, are not all there is to strive for, but that research or discovery of new laws or of more complete order rests on a higher plane. Dr. Glazebrook then contrasted the lot of the students of the institute with that of men in similar positions a hundred years ago, pointing

out in a review of the early life and struggles of Faraday how difficult it was then to obtain the least help in study compared with the accessible advantages that are so widely distributed over the country to-day. The students accordingly should fully appreciate their opportunities and use them to the best advantage, not merely as a means for the acquisition of knowledge, valuable and important as this is, and, above all, not as something which may lead to material advancement, but as a means of training the powers possessed by each so as to develop them for action beneficial both to themselves and to their fellows. A hundred years ago men like Faraday, Watt, and Arkwright worked at a time when the world was comparatively young in knowledge; they had a clean slate to write upon. But while the difficulties of their pioneer work were enormous, and they started from a position of comparative ignorance of scientific principles, and simple in character as their respective discoveries were, the applications which have followed from them have led to a high general level of scientific knowledge to-day which has become the starting point for modern conditions of study. Accordingly, if the country is to profit by the modern progress of science, the mass of the people must be educated up to this higher plane of knowledge, for it is by intelligent action and patient effort and devotion on the part of the rank and file of workers that general advances come. The work of the Sir John Cass Institute and of similar schools throughout London is exerting a most important influence in securing this higher level of knowledge for those engaged in work associated with the industries of the country.

SOCIETIES AND ACADEMIES.

LONDON.

Royal Society. June 20—"On the presence of Sulphur in some of the Hotter Stars." By Sir Norman Lockyer, K.C.B., F.R.S.

In this paper the author gives an account of the discovery of the strongest spark lines of sulphur in the spectrum of Rigel. These lines had not previously been traced in any celestial spectrum. It is also shown that two strong sulphur lines (4253.8, 4285.1), which are of abnormal behaviour in the spark and vacuum-tube spectra, are lacking in the Rigel spectrum. They have been found to occur, however, in the Crucian (Bellatrix) and Alnitamian (ϵ Orionis) types of stellar spectra, which represent higher stages of temperature than the Rigelian type. In the two types mentioned the Rigel-sulphur lines are either lacking or very weak.

Concisely, the following represents the relative and inverse behaviour of the two sets of lines in stellar spectra:—

Group	Type Star	Sharp Lines (4253.8, 4285.1)	Diffuse lines
Alnitamian	ϵ Orionis	Well shown	Absent
Crucian	γ Orionis	Present, but weaker than in ϵ Orionis	Strongest lines present, but weaker than in β Orionis
Rigelian	β Orionis	Absent	Well shown

November 7.—"Note on the Association of Helium and Thorium in Minerals." By the Hon. R. J. Strutt, F.R.S.

The question has been often raised of whether or not helium is a product of thorium radio-activity. The author's view throughout has been that it is (Roy. Soc. Proc., vol. lxxiii., p. 191, 1904, also March 2, 1905). Mr. Boltwood has recently argued that the helium in radio-active minerals may always be attributed to the action of the uranium-radium series of transformations (*Am. Journ. Sci.*, vol. xxiii., February, p. 77). In the present note the author directs attention to a case where that view is clearly untenable.

Prof. Julius Thomsen, of Copenhagen, described, in 1898 (*Zeit. physikalische Chemie*, vol. xxv., part iii.), a helium mineral from Ivigtut, Greenland, similar in some respects to fluor-spar, but containing rare earths. Recently he has determined the quantity of helium liberated on

heating as 27 c.c. per kilogram (*Bull. de l'Acad. Royale des Sciences*, Copenhagen, 1904, 53-57).

Prof. Thomsen kindly sent a supply of this mineral to the author, who has carefully tested it for radium, and finds that it contains no more than the traces which are ubiquitous in rocks and minerals. The quantity found was, in fact, about the same as in average rocks, and is insufficient to account for one-hundredth part of the helium present.

On the other hand, a solution of the mineral gave abundant thorium emanation. The author is inclined to think that there is some unknown complication about the thorium-emanating power of solutions which makes it unsafe, in certain cases at least, to infer from it the quantity of thorium present; but enough thorium emanation was given off by the solution to show that thorium was a substantial constituent of the mineral. He regards it as entirely certain that the helium in this mineral has not been generated *in situ* by uranium or radium, and has no hesitation in connecting it with the presence of thorium.

"On the Measurement of Temperatures in the Cylinder of a Gas Engine." by Prof. Callendar, F.R.S., and Prof. W. E. Dalby.

It is important in the experimental investigation of the internal-combustion engine to be able to measure the temperature at a suitable point in the cycle.

The difficulty of making this direct measurement arises from the fact that during the cycle of operations in the working cylinder the temperature rises above the melting point of platinum or of any thermoelectric couple which can be used for the observation. Also, since the temperature is changing so rapidly, whatever apparatus is used to measure the temperature must have small mass; moreover, its insertion in the cylinder of the engine must not alter the volume or disposition of the clearance space, otherwise there will be danger of pre-ignition.

The authors use a platinum wire 0.01 inch diameter and 1 inch long in conjunction with a compensator of the same diameter and $\frac{3}{8}$ -inch long, and the temperature is measured by measuring the change of resistance corresponding to the middle $\frac{3}{8}$ -inch of the 1-inch wire. To avoid the difficulty experienced by previous experimenters in this direction, the platinum thermometer is screened from the high temperature by placing it in a valve which allows the thermometer to be exposed during any part of the cycle for a suitable interval of time, and to be perfectly protected from the high temperature when the valve is closed. This valve is contrived in the spindle of the admission valve, and the gear for operating it is clearly shown in the figures in the paper. The advantage of this position is that as the whole charge of air and gas streams into the cylinder around the spindle of the admission valve the temperature of the valve and the thermometer inserted in it are brought continually into approximation during the whole of the suction stroke, so that at the instant when the contact is made for the measurement of the temperature, namely, just after the close of the admission valve, the thermometer and the temperature it is required to measure do not differ widely in temperature; moreover, at this point in the cycle the rate of change of the temperature is nearly a minimum. In measurements of this kind it is essential that there should be no missed explosions, and the authors therefore arranged the engine so that this condition should be exactly fulfilled during the whole of the experiments.

Experiments were made to determine the lag of the platinum thermometer behind the temperature of the fluid it purported to measure, and to determine the effect of the valve carrying the thermometer on the temperature indicated by the thermometer. The conclusion arrived at by the authors is that the method may be used to give the temperature of the charge at the beginning of compression within 1° C.

A few experiments were quoted in the paper, from which it appears that at full load the temperature rises to a point between 2000° C. and 2500° C. when the mixture is rich.

Geological Society, November 6.—Sir Archibald Geikie, K.C.B., Sec.R.S., president, in the chair.—A collection of fossil plants from South Africa; Prof. A. C. Seward. The material on which this paper is based was, for the